REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

Claims 1 through 6 and 8 through 23 are pending in the application with claims 1 and 2 having been currently amended. Entry of these amendments is respectfully requested as it is believed they put the application in condition for allowance or in better condition for appeal.

As background, the text is written essentially to differentiate the present invention from prior "bopper-type" deflectors, it being understood at the time that the use of a synchronous motor was novel/inventive. However, the various rejections are based on "pusher-type" devices at least one of which utilizes a synchronous motor – even if in a different way and for a different reason. Despite that, it is firmly believed that the present disclosure does provide the basis for the proposed revisions deemed necessary to differentiate the present invention from the prior art.

The mode of action of the present invention involves the controlled "hurling" or "flinging" of the article to its destination. Such action is *not* dependent solely on the longitudinal action of the conveyor *and/or* the lateral thrust off the conveyor as required by most prior art devices although, both need to be taken into account when setting up the action required to be effected by the paddle of the present invention. The paddle "slings" (see page 11, line 4 of the specification) the article to its destination which can, because of the mode of action, be at any angle to the conveyor, *even greater than 90 degrees, i.e. backwards*. The *same* paddle effects *all* rejections to different destinations simply by being programmed to do so in response to different signals. This is all pre-set – no further adjustment or manipulation is required.

The Examiner's position appears to be that replacing a motor in any prior device, especially one having a solenoid to activate the ejector member, renders the present device obvious. However, the issue is not simple speed since, as explained in detail later, speeding up the ejector action in most cases will not significantly help – see Fenn in combination with Cottrell since it does not change the mode of action of the deflector.

It may also be noted that Cottrell was issued in 1989 and that any alleged "obvious" solution based on its teaching has not – until now! – been arrived at despite the problem still existing and getting worse as production lines have gotten much faster. The shown adoption of a synchronous motor is in Avery where it was adopted "... for quiet motor operation and smooth pusher device acceleration and deceleration" (see abstract of Hager U.S. Patent No. 6,041,910) and in Cottrell where it is used simply to speed up the movement of the static deflector from a first to a second position where it awaits the arrival of an article.

Discussion of Amended Claims 1 and 2

As revised, these claims now emphasize that the action of movement of the article off the deflector member, termed "paddle" in the text, is in the nature of being hurled or flung rather than "pushed" as is taught in many of the citations. However, the phrase used in the text is "The action of the paddle may be likened to that of a sling as it sweeps the article out of the line of articles ..." see page 11, lines 4-6. The term "paddle", of course, implies an active action thrusting the article away from it.

In this connection, the term "thrust" is used on several occasions (e.g., page 11, last line) and it is clearly stated that "following the initial engagement (with the bottle) the paddle continues its rotation until it has rotated through a predetermined angle or degree of arc which, in combination with the speed the paddle moves, determines the force applied to the article and the distance and direction the diverted article takes (page 10, last line - page 11, line 4).

Note also that all the prior devices utilize a pusher or deflector member that extends essentially *totally across the conveyor* – i.e., they are in constant contact with the articles as they lead or guide the article until it is off the conveyor.

The paddle in the present case contacts and immediately *slings* or *bats* the article away and immediately removes itself from the pathway. That is, it needs only a small amount of force to thrust the article to a specific (variable at will) location.

It should also be noted that the paddle action does not involve a heavy load on the paddle; in other words, the paddle does not "hold up" the full weight of the article – it merely flips it out of the way. Hence, there is less wear and tear and associated downtime and maintenance costs compared with devices employing deflector members which "bop", "catch", hold up, or otherwise impede the article, as is the case in the citations.

In the preferred embodiment described in the specification, the paddle accelerates to contact and sling/sweep the bottle from the conveyor, following which it rapidly decelerates to a stop, reverses direction, and returns to its base position outside of the path of travel of the bottles. To be more specific, in the commercial operation contained in the present specification, the paddle

extends a total of 21 degrees outwardly from its base position parallel to the conveyor wall. This means that the downstream (i.e., outermost) edge of the paddle (length 6.9 cm – see page 20 of the Specification) travels about 2.5 centimeters (cm) away from the conveyor wall. The items, in this case beverage bottles, each have a diameter of about 6 cm and the conveyor upon which they are traveling is, obviously, wider than that. It can be seen, therefore, that the paddle extends *much less than halfway across the conveyor* in providing the desired thrust to propel – and not simply remain in contact with and guide – the bottle off the conveyor to the desired location. The short distance of travel also reduces the time required to complete a rejection cycle allowing for greater production rates. Furthermore, the speed of response of the synchronous motor is much greater than conventional motors and much more so when the paddle is carried by the motor drive shaft.

Turning to the Specific Rejections:

Section 102 rejection based on Avery

This does teach the use of a synchronous motor driven *pusher* cam. The cam action involves a certain type of action – "The uniform velocity provides a soft and gentle push of the luggage off the conveyor belt". The action is essentially the *opposite* of the present paddle which "collects" (contacts) the bottle and then slings it away and off the conveyor. Very clearly, the Avery device is specifically designed *not* to hurl the luggage anywhere!

In summary, the mode of *action* of the paddle now clarified in the revised claims, is very different from that of Avery and not anticipated thereby.

Note also that, as a factual matter, luggage streams – the most obvious example being in airports (see column 1, lines 25/6 of Avery) are not usually comprised of nicely spaced single file articles. Of course, further – and expensive in cost and floor area to install – devices could be provided, but these, in addition to cost and lost space, would simply require further actions slowing down the whole process.

It is submitted that this is a situation where the total *context* of the Avery device, the objective and means to accomplish it, would *in fact* not lead one to consider it, or a modification of it, for use in removing a much smaller, fragile item from a very high speed single file stream of articles.

Additionally, therefore there is no valid Section 103 argument possible based on Avery.

Section 103 Rejection Based on U.S. 2,945,588

to Fenn In Light of Cottrell U.S. 4,836,387

Firstly, the actual deflector member – ejector arm 73 does *not* rotate: "...tension spring 75 to an arm 76 on the shaft 72 so that as the solenoid is energized, the *shaft* is rotated to swing the ejector arm 73 into engagement with the unclear bottle or container B as shown in **FIG. 10** to *push* the container onto the take off table 57. *The ejector arm in this position also prevents advance of the succeeding containers* if and when the wheel 45 should fail to stop the containers." (Col 4, line 70 to Col 5, line 6) (see copy **FIGS. 5-10** attached)

In summary:

1. Ejector arm 73 does not rotate – it travels essentially laterally across the conveyor B;

2. Ejector arm 73 is specifically designed to hold up, i.e. impede the progress of the following containers;

3. Containers are in constant contact with ejector arm 73 until they are pushed right off container B to one set location on table 57;

4. The part of ejector arm 73 which contacts the container A is contoured to match the shape of container A and actually "holds" the container to some extent. In other words, the container A is effectively prevented from "escaping" the contact of ejector arm 73 and cannot fall over. This shaping of the ejector arm is known – refer for example to U.S. 2,689,647 **FIG. 1** (attached). This device (of the "bopper-type") has certain disadvantages as noted in the present specification and, incidentally, in U.S. 4,750,620 at lines 12 to 27, Col 1 attached).

In summary, the device of Fenn:

- Maintains contact with the ejecting container until it is off the conveyor;
- The container is simply *pushed* and laterally off the conveyor;
- The device is designed to *stop* the container following the ejecting container or use the ejector arm to contact and hold up that following container.

It is clear that no matter what motor is used in the Fenn device, whether it is a stepping motor as taught by Cottrell or any other, it is still a device which *inter alia* stops the flow of containers while it is ejecting a container, which *modus operandi* is the direct opposite of the present invention.

In conclusion, it is respectfully submitted that the present invention is not rendered obvious by the combination of Fenn in the light of Cottrell and is patentable thereover.

With respect to Claim 2, please note that none of the references teach inclining the paddle to assist in preventing toppling of bottles; a problem, incidentally, only significant in a case where bottles are thrust away as taught by the present invention. An article being (gently) pushed is not inclined to fall over – especially if it is of the stable type, such as the luggage variety weighing tens of pounds and having a very low center of gravity as is taught by Avery.

Cottrell does teach, in effect, reversing the motor to move the deflector member from position A to position B. Note that the mode of action of the simple deflector is *not* a "sling" action – it is simply a "deflector" – and that the range of movement thereof is fixed *and* by physical stops. Compare this mode of action with the present invention paddle whose degree of travel is fixed by the (programmed) motor which allows for an "infinite" number of variable movements of the paddle to hurl the articles in the direction of and into an "infinite" number of receptacles using the *one paddle*.

Section 103 Rejection Based on U.S. 4,549,272 to Hagen in Light of Cottrell

Hagen is actually only concerned with the *rapid* evaluation of the characteristics of articles traveling on a conveyor. The reason for the invention is stated at Column 13, Lines 7 – 12: "Because of the high speed achievable with commercially available microprocessors, the foregoing operations can be performed with sufficient rapidity that the decision as to which container an article should be placed in is made virtually known immediately after the article exits opening 36". Also at Column 15, Lines 6 - 10: "Because the measurement can be made virtually instantaneously diverting equipment at the outlet of the sensor can be activated in time to effect sorting or other classification of the articles." Please note that the sorting involves the use of successive multiple simple static deflectors already fixed in place for the article to contact and be guided off the conveyor to a receptacle.

In other words, speed of the diverting equipment is not an issue at all; the detection equipment provides all the time that is needed. In fact, Hagen spends very little time describing the article diverting mechanisms. However, the diverting mechanism simply comprises a series of successively located blades (210a, etc.) each having an associated product "bin" each blade base position lying against a sidewall of conveyor 208 and in an activated position – refer **FIG. 4** - lies totally across the conveyor 108 surface. As clearly stated, there is an abundance of time to reach the active position and it is equally clear, the blades are already in that position when contacted by an arriving article (potato as shown), which is simply deflected by sliding along the blade and falls off conveyor 108 into a receptacle (e.g. #2).

In summary, there is no reference to "sweeping" of any type - only diverting, which is a simple deflection. It is respectfully submitted that suggesting using a stepped motor in Hagen adds nothing of significance and is just not well founded. Hagen explicitly states that speed of action of the diverter device is not a problem. The type of diverter is also not warranted a discussion and adding a stepped motor would not result in a change in the *mode of action* of the disclosed diverter device. As the Examiner states, Cottrell teaches the use of a stepped motor to operate a "deflector" moveable between first and second positions and located in a path of movement of the articles to be sorted (Column 1, Lines 14 - 16). In fact, the motor moves an anvil 15 which is physically/mechanically arrested by end stops 17 and 18. Deflector 21 is fixed to the same shaft and obviously travels in sync with the anvil 15. In other words, the motor is not programmed to determine the extent, etc. of movement of the deflector as is taught by the present invention.

In view of the foregoing, it is submitted that this application is now in condition for allowance and an early Office Action to that end is earnestly solicited.

Respectfully submitted,

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July 19, 1960 G. C. FENN ET AL 2,945,588

BOTTLE INSPECTION APPARATUS AND METHOD

Filed March 1, 1957 5 Sheets-Sheet 5

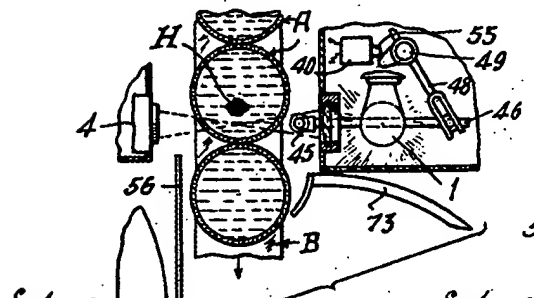

Fig. 5

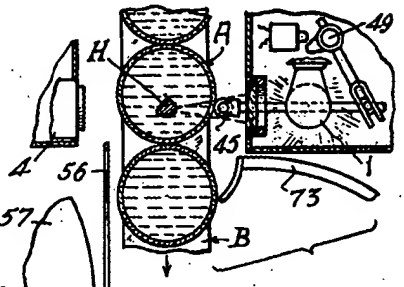

Fig. 6

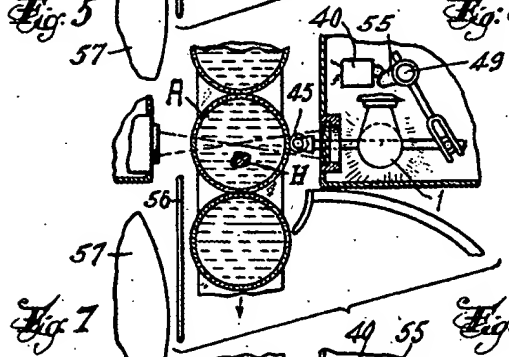

Fig. 7

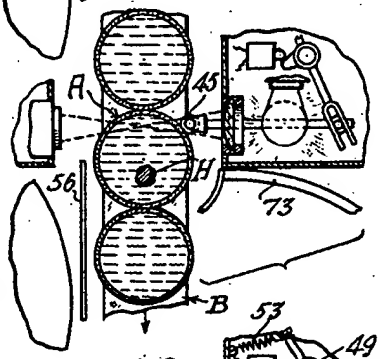

Fig. 8

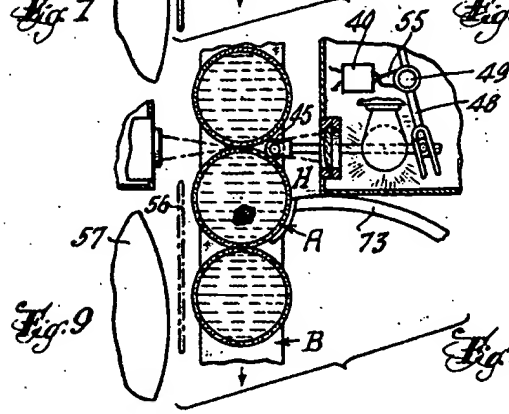

Fig. 9

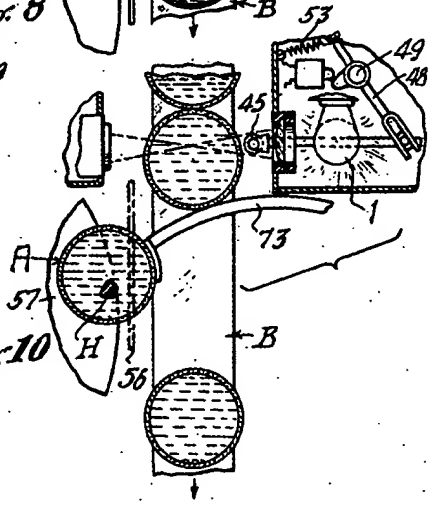

Fig. 10

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Sept. 21, 1954 J. H. HOFSTETTER ET AL 2,689,647

BOTTLE CAP POSITION DETECTOR

Filed Sept. 2, 1952

Fig. 1.

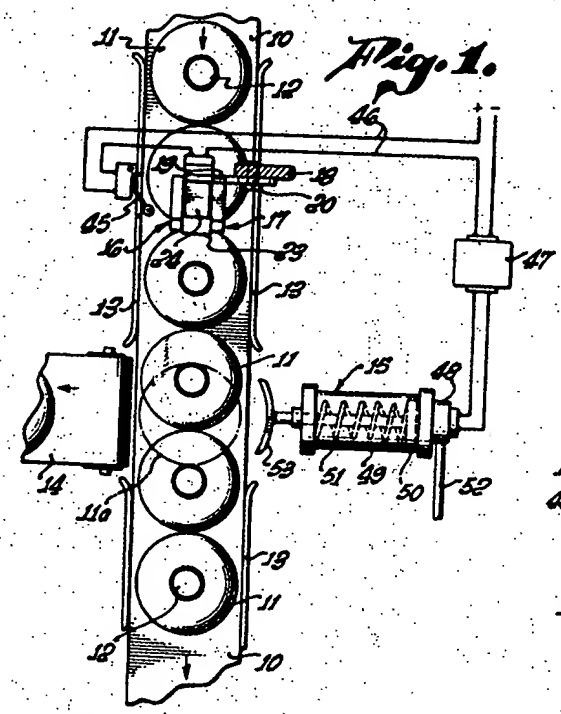


Fig. 4.

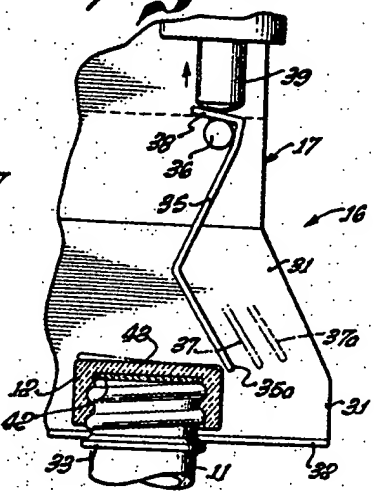


Fig. 2.

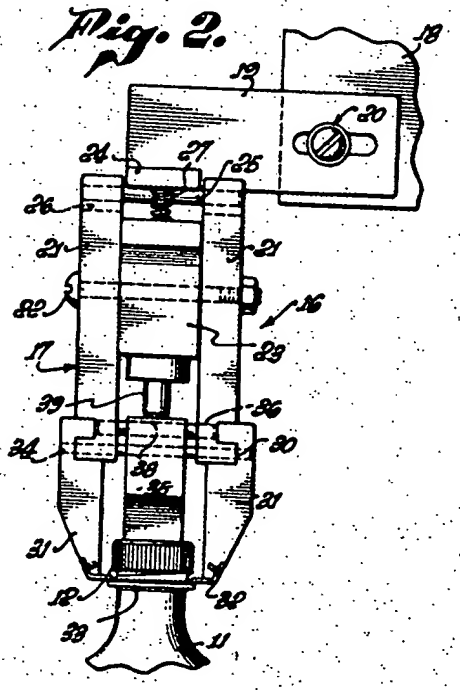
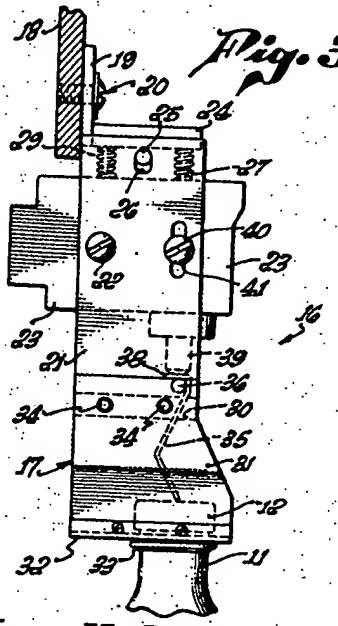


Fig. 3.



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METHOD AND APPARATUS FOR SORTING OUT PACKAGED ITEMS IDENTIFIED AS DEFECTIVE

This application is a continuation of application Ser. No. 719,254, filed Apr. 2, 1985, now abandoned.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to sorting out packaged items identified as defective.

2. Description fo the Related Art

U.S. Pat. No. 2,689,647 describes a sorting-out device of this type wherein the diversion means, imparting to a bottle to be sorted out a kinetic impulse transversely to the conveying direction, is designed as a plunger exhibiting at its free end a shoe adapted to the external contour of the bottle. The kinematics of the plunger moving transversely to the conveying direction of the bottles causes a rebounding effect with an impact or striking stress being exerted on the bottle to be sorted out; such stress permits, to avoid disturbances by bottles falling over during the ejection step, merely relatively low operating speeds of the bottle processing machines, e.g. a dispensing machine or a labeling machine, connected to such a pusher sorting-out device in combination with a testing unit.

The sorting-out device according to German Patent 3,110,883 brought decisive improvement with respect to operating speed and operating safety of the aforedescribed pusher sorting-out device; in this patent, the diversion means is fashioned as a plunger exhibiting at the free end at least one roller rotatably mounted about a perpendicular axis and provided with a peripheral hoop of foam rubber or the like. The roller, in the rest position, projects by a small degree into the conveying path of the packaged items, preferably bottles. By means of this sorting-out device, the bottles, during the ejection process, are only slightly braked and accordingly do not experience practically any relative movement in the conveying direction with respect to the conveyor belt. Due to this mode of operation, the bottles can be transported past the sorting-out device on the conveyor belt without spacings, and bottle dispensing plants equipped with such a sorting-out device in combination with a corresponding testing unit attain high production efficiencies. The disadvantage of this conventional installation is to be seen in that the roller with foam rubber lining and the roller bearing at the free end of the plunger must be exchanged at regular intervals on account of the wear and tear and contamination that occur.

SUMMARY OF THE INVENTION

The invention provides a sorting out method and apparatus of the type discussed, which is distinguished by high speed and a simple construction with a low number of wear-resistant components that are safe in operation.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be described in detail below with reference to an embodiment illustrated in the drawing wherein:

FIG. 1 is a schematic top view of the sortingout apparatus of this invention and

FIG. 2 is a section along line II—II in FIG. 1.

DETAILED DESCRIPTION OF THE INVENTION

The apparatus 1 according to FIG. 1 for sorting out, for example, bottles 2 which have not been properly filled, is controlled by a filling level control device 3 arranged, for example, downstream of a dispensing machine, not shown. The filled bottles 2 are transported by means of a conveyor belt 4 in the direction of arrow a from the filling machine to the filling level control device 3 and from there to the sorting-out device 1. Guard railings 6, 7 ensure that the bottles 2 of the stream of bottles arrive in alignment at the diversion means 5 of the sorting-out device 1. The diversion means 5 pushes the improperly filled bottles over to a second conveyor belt 8 extending directly beside the first conveyor belt 4 in parallel thereto and being normally driven at the same speed.

The deflecting means 5 of the sorting-out device 1 comprises a motor-drivable shaft 9 with a spiral coil segment 10 ascending in the belt traveling direction a and extending over an angle of rotation of approximately 180°. The drive shaft 9 is arranged outside of the path of motion of the bottles 2 and in parallel to the conveyor belts 4, 8. The drive shaft 9 and the spiral coil segment 10 of the sorting-out device 1 are fashioned integrally and preferably consist of a synthetic resin.

The shaft 9 with the spiral coil segment 10 of the sorting-out device 1 is driven by an electric motor 11 via a clutch 12 that can be activated by the filling level control device 3 and via a toothed belt 13.

The mode of operation of the sorting-out apparatus is as follows:

In the rest position, the spiral coil segment 10 of the drive shaft 9 is disposed outside of the path of movement of the bottles 2. Upon identification of a flawed bottle by the filling level control unit 3, the clutch 12 is engaged by a control pulse from the control device at the moment that the defective bottle arrives at the spiral coil segment 10. The clutch 12 couples the drive shaft 9, together with the spiral coil segment 10 of the sorting device 1, with the electric motor 11 per control pulse for execution of a revolution; the electric motor runs with constant operation. The revolution of the spiral coil segment 10 effects a pushing over of the bottle 2 recognized as being defective from the first conveyor belt 4 to the sorting-out belt 8. The speed of rotation of the spiral coil segment 10 is adapted to the traveling speed of conveyor belt 4 so that the point of attack and/or surface of attack with which the spiral coil segment 10 comes in contact with the bottle to be sorted out will move along with the bottle in synchronism; the bottle executes a pushing-over movement in the direction of arrow c resulting from the motion component a of the conveyor belt 4 and the transverse motion component b induced by the spiral coil segment 10.

The pushing over of the defective bottles to the sorting-out belt takes place with the spiral coil segment over a time period of milliseconds whereby substantially more favorable force transmission relationships arise between the diversion means and the bottle than in the conventional sorting-out devices which push the flawed bottles over in a single instant by means of a plunger. This kinematic behavior of the sorting-out device 1 permits a sorting out that is safe in operation for defective bottles in bottle processing plants with washing installations, dispensing and labeling machines,